Operating Instruction Manual

Generic Slave DTM for CANopen Slave Devices

Configuration of CANopen Slave Devices

Hilscher Gesellschaft für Systemautomation mbH

www.hilscher.com

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1 Introduction

1.1 About this Manual

This manual provides information on how to set up CANopen Slave devices described with EDS files. These devices can be configured with the CANopen generic Slave DTM within an FDT Framework.

Dialog Panes

The table below gives an overview for the individual dialog panes descriptions:

Section	Subsection	Manual Page
Configuration	*General Settings*	*18*
	Special Function Objects	*19*
	Object Dictionary	*22*
	Process Data Objects	*25*
	PDO Properties	*25*
	PDO Mapping	*28*
Device Description	*Device*	*28*
	EDS	*31*

Table 1: Descriptions Dialog Panes

1.1.1 Online Help

The generic CANopen Slave DTM contains an integrated online help facility.

- To open the online help, click on **Help** or press **F1**.

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1.1.2 List of Revisions

Index	Date	Version	Component	Chapter	Revisions
5	12-11-07	1.7.x.x, 1.7.x.x, 1.0.x.x	CANopenGenSlaveDTM.dll, COGenericSlaveDtmGui.ocx, CoEDSParser.dll	All	Revised
6	13-04-05	1.7.x.x, 1.7.x.x, 1.0.x.x	CANopenGenSlaveDTM.dll, COGenericSlaveDtmGui.ocx, CoEDSParser.dll	1.3.1	Section *Requirements*, Windows 8 added.

1.1.3 Conventions in this Manual

Notes, operation instructions and results of operation steps are marked as follows:

Notes

Important: <important note>

Note: <note>

<note, where to find further information>

Operation Instructions

1. <instruction>
2. <instruction>

or

➢ <instruction>

Results

↯ <result>

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1.2 Legal Notes

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1.3 About Generic CANopen Slave DTM

You can use the CANopen generic Slave DTM to configure the CANopen Slave devices described with EDS files within a FDT Framework.

The information necessary for the configuration of the CANopen Slave devices is stored within the CANopen Master device when using the CANopen generic Slave DTM and thus the Master device is configured.

1.3.1 Requirements

System Requirements

- PC with 1 GHz processor or higher
- Windows® XP SP3, Windows® Vista (32 bit) SP2, Windows® 7 (32 bit) SP1, Windows® 7 (64 bit) SP1, Windows® 8 (32 bit) or Windows® 8 (64 bit)
- Administrator privilege required for installation
- Internet Explorer 5.5 or higher
- RAM: min. 512 MByte, recommended 1024 MByte
- Graphic resolution: min. 1024 x 768 pixel
- Keyboard and Mouse

Note: If the project file is saved and opened again or if it is used on another PC, the system requirements must match. Particularly the DTM must be installed on the used PC.

Restriction

Touch screen is not supported.

Requirements CANopen Generic Slave DTM

Requirements for working with the CANopen generic Slave DTM are:

- Installed FDT/DTM V 1.2 compliant frame application
- Installed CANopen Master DTM
- EDS file of the devices to be configured
- The user needs to reload the Device Catalog

Loading EDS files

To add devices to the **netDevice** device catalog, you must import the EDS file of the used device via **netDevice** menu **Network > Import Device Descriptions ….** into the EDS folder of the DTM. Then the Device Cataloge must be reloaded. The folder EDS inclusively Windows® XP is located in the application data directory (All Users) of the configuration software (or from with Windows® 7 on in the *C:\ProgramData\ SYCONnet* directory).

For further information refer to section *Configuration Steps* on page 14 , under step 1 and 2.

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1.4 Dialog Structure of the Generic CANopen Slave DTM

The graphical user interface of the DTM is composed of different areas and elements listed hereafter:

1. A header area containing the **General Device Information**,
2. The **Navigation Area** (area on the left side),
3. The **Dialog Pane** (main area on the right side),
4. **OK**, **Cancel**, **Apply**, **Help**,
5. The **Status Line** containing information e. g. the online-state of the DTM.

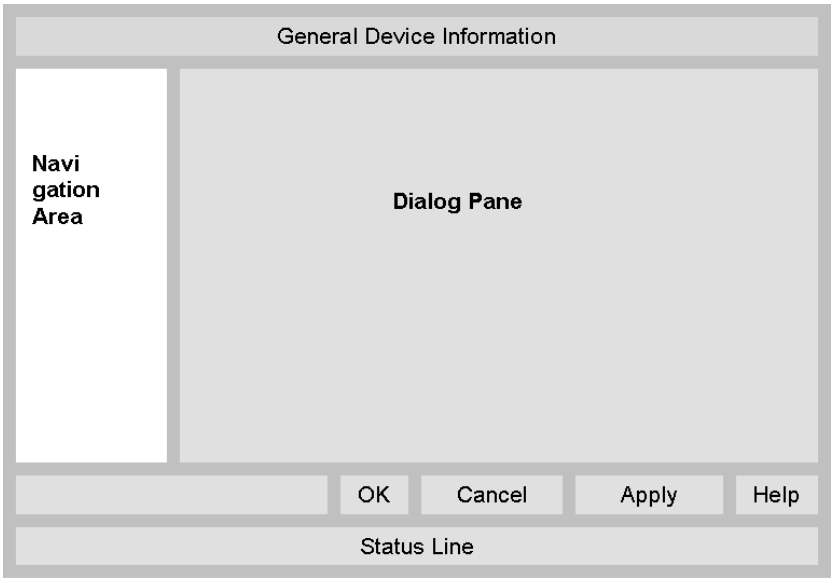

Figure 1: Dialog Structure of the Generic CANopen Slave DTM

1.4.1 General Device Information

Parameter	Meaning
IO Device	Name of the device
Vendor	Vendor name of the device
Device ID	Identification number of the device
Vendor ID	Identification number of the vendor

Table 2: General Device Information

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1.4.2 Navigation Area

The **Navigation Area** contains folders and subfolders to open the dialog panes of the DTM.

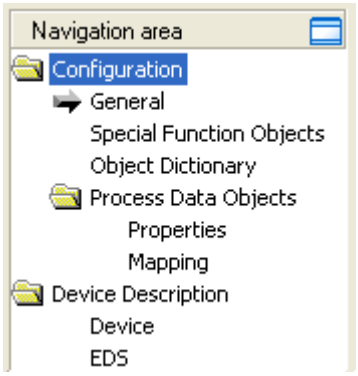

Figure 2: Navigation Area

➢ Select the required folder and subfolder.

➢ The corresponding Dialog pane is displayed.

Hide / display Navigation

	Hiding the navigation area (above right side).
Show navigation area	**Opening** the navigation area (below left side).

1.4.3 Dialog Panes

At the dialog pane the **Settings** or **Device Description** panes are opened via the corresponding folder in the navigation area.

Configuration	
General	The dialog **General Settings** displays EDS file data. For further information see section *General Settings* on page *18*.
Special Function Objects	The dialog **Special Function Objects** displays data of the synchronization, time stamp and emergency message. For further information see section *Special Function Objects* on page *19*.
Object Dictionary	The dialog **Object Dictionary** represents the object dictionary of the device. The display shows data read out from the EDS file. For further information see section *Object Dictionary* on page *22*.
Process Data Objects	PDO Properties: In the dialog **PDO Properties** the transmit and the receive PDOs are displayed. For further information see section *PDO Properties* on page 25.
	PDO Mapping: The dialog **PDO Mapping** permits to map the contents of a PDO. For further information see section *PDO Mapping* on page *28*.
Device Description	
Device	The **Device Info** pane contains the manufacturer information about the device. For further information see section *Device* on page *28.*
EDS	By use of the **EDS Viewer** pane an EDS file can be viewed and searched through. For further information see section *EDS* on page *31.*

Table 3: Overview Dialog Panes

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1.4.4 OK, Cancel, Apply and Help

OK, **Cancel**, **Apply** and **Help** you can use as described hereafter.

	Meaning
OK	To confirm your latest settings, click **OK**. All changed values will be applied on the frame application database. *The dialog then closes.*
Cancel	To cancel your latest changes, click **Cancel**. Answer to the safety query **Configuration data has been changed. Do you want to save the data?** by **Yes**, **No** or **Cancel**. **Yes**: The changes are saved or the changed values are applied on the frame application database. *The dialog then closes.* **No**: The changes are not saved or the changed values are not applied on the frame application database. *The dialog then closes.* **Cancel**: *Back to the DTM.*
Apply	To confirm your latest settings, click **Apply**. All changed values will be applied on the frame application database. *The dialog remains opened.*
Help	To open the DTM online help, click **Help**.

Table 4: OK, Cancel, Apply and Help

1.4.5 Table Lines

In the DTM dialog pane table lines can be selected, inserted or deleted.

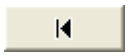
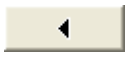
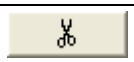
	Meaning
	To select the first line of a table use **First Line**.
	To select the previous line of a table use **Previous Line**.
	To select the next line of a table use **Next Line**.
	To select the last line of a table use **Last Line**.
	Create a new Line inserts new lines into the table.
	**Delete selected Line** deletes the selected line from the table.

Table 5: Selecting, inserting, deleting Table Line

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1.4.6 Status Bar

The **Status Bar** displays information about the current state of the DTM. The current activity, e.g. the DTM connection state, is signaled graphically via icons in the status bar.

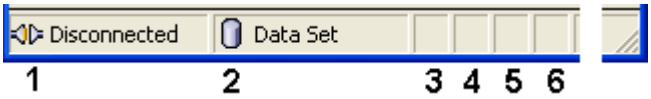
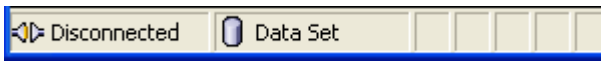


Figure 3: Status Bar – Status Fields 1 to 6

Status Field	Icon / Meaning	
1	**DTM Connection States**	
		Connected: Icon closed = Device is online
		Disconnected: Icon opened = Device is offline
2	**Data Source States**	
		Data set: The displayed data are read out from the instance data set (database).
		Device: The displayed data are read out from the device.
3	**States of the instance Date Set**	
		Valid Modified: Parameter is changed (not equal to data source).

Table 6: Status Bar Icons [1]

Offline State



Online State

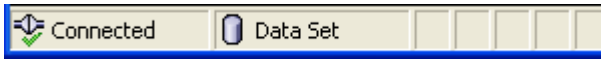


Figure 4: Status Bar Display Example

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2 Getting started

2.1 Configuration Steps

The following overview describes the steps to configure a CANopen Slave device with the CANopen generic Slave DTM as it is typical for many cases. At this time it is presupposed that the CANopen Master DTM installation was already done.

The overview lists all the steps in a compressed form. For detailed descriptions of each step refer to the sections noted in the column *For detailed information see section*.

#	Step	Short Description	For detailed information see section	Page
1	Add CANopen Slave in the Device Catalog	Add the Slave in the Device Catalog by importing the device description file to the Device Catalog. Depending of the FDT Container. For netDevice: - **Network > Import Device Descriptions**.	*(See Operating Instruction Manual netDevice and netProject)*	-
2	Load device catalog	Depending of the FDT Container: For netDevice: - select **Network > Device Catalog**, - select button **Reload Catalog**.	*(See Operating Instruction Manual netDevice and netProject)*	-
3	Create new project / Open existing project	Depending of the frame application. For the configuration software: - select **File > New** or **File > Open**.	*(See Operating Instruction Manual of the Frame Application)*	-
4	Insert Master or Slave device into configuration	Depending of the FDT Container: For netDevice: - in the Device Catalog click to the Master, - and insert the device via drag and drop **to the line** in the network view, - in the Device Catalog click to the Slave device, - and insert the device via drag and drop **to the Master bus line** in the network view.	*(See Operating Instruction Manual of the Frame Application)*	-
5	Configure Slave device	Configure the Slave device. - Double click to the device icon of the Slave. - The Generic Slave DTM configuration dialog is displayed. In the Generic Slave DTM configuration dialog: - select **Configuration >Object Dictionary**, - define the object filters, - Select **Configuration > Special Function Objects**, - select the options for the synchronization, time stamp and emergency message, - select **Configuration > Process Data Objects > PDO Properties**, - configure the PDO to be used for the communication, - select **Configuration > Process Data Objects > PDO Mapping**, - configure the list of the mappable or the list of the mapped objects each, - close the Generic Slave DTM configuration dialog via the button **OK**.	*Configuring Device Parameters* *Object Dictionary* *Special Function Objects* *PDO Properties* *PDO Mapping*	17 22 22 25 28
6	Configuration Steps Master device	Configure the Master device via CANopen Master DTM.	*(See Operating Instruction Manual DTM for CANopen Master devices)*	-

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#	Step	Short Description	For detailed information see section	Page
7	Save project	Depending of the frame application. For the configuration software: - select **File > Save**.	*(See Operating Instruction Manual of the Frame Application)*	-

Table 7: Getting started - Configuration Steps

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3 Configuration

3.1 Overview Configuration

Dialog Panes “Configuration”

The table below gives an overview about the available **Configuration** dialog panes descriptions:

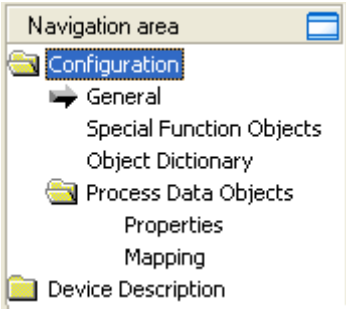
Generic CANopen Slave DTM	Folder Name / Section	Page
	*General Settings*	*18*
	Special Function Objects	*19*
	Object Dictionary	*22*
	Process Data Objects	*25*
	PDO Properties	*25*
	PDO Mapping	*28*

Table 8: Descriptions of the Dialog Panes Configuration

Notice the descriptions in the section *Configuration Steps* on page 14.

Note: Access to the configuration panes is enabled without requirement of user rights. However for editing certain user rights are required. Further information can be found in section and *User Rights* on page 33.

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3.2 Configuring Device Parameters

The following steps are needed to configure the device parameters using the Generic CANopen Slave DTM:

Object Dictionary

1. Define the object filters.

➢ Select **Configuration >Object Dictionary** in the navigation area.

Special Function Objects

2. Select the configuration options for the synchronization, time stamp and emergency message.

➢ Select **Configuration > Special Function Objects** in the navigation area.

➢ Select whether:

- the CANopen Slave device shall generate the synchronization message,
- the CANopen Slave device shall consume/produce the time stamp message,
- the CANopen Master device shall be able to receive the emergency message,
- and whether for each of these messages the 29-bit CAN-ID of the CAN-ID extended frame shall be valid.

Process Data Objects

3. Configure the PDO.

➢ Select **Configuration > Process Data Objects > PDO Properties** in the navigation area.

➢ Configure the PDO to be used for the communication.

4. Configure the PDO Mapping.

➢ Select **Configuration > Process Data Objects > PDO Mapping** in the navigation area.

➢ Configure the list of the mappable or the list of the mapped objects each.

Close Generic Slave DTM Configuration Dialog

5. Click **OK** in order to close the Generic Slave configuration dialog and to store your configuration.

Further Information

For more information refer to section *Object Dictionary* on page 22, *Special Function Objects* on page 22, *PDO Properties* on page 25 and *PDO Mapping* on page 28.

3.3 General Settings

The dialog **General Settings** displays EDS file data:

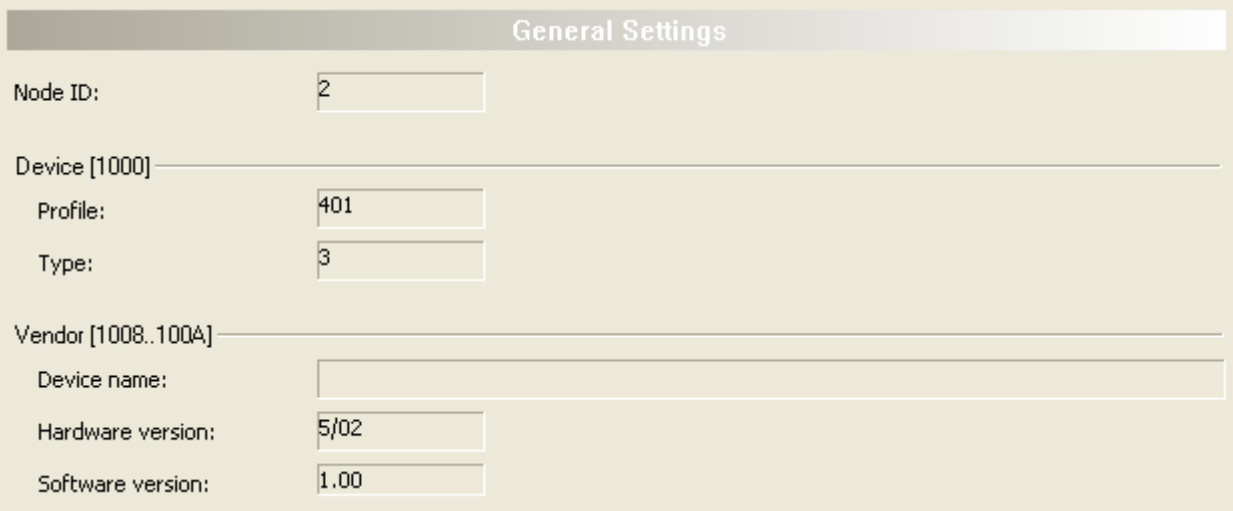

Figure 5: General Settings

3.3.1 Node ID, Device, Vendor

Parameter	Meaning	Range of Values / Value
Node ID	The **Node ID (address)** is required to address the device at the bus and must be unique within the CANopen network. Therefore it is not allowed to use this number twice in the same network and must match with the set Node address of the device. Otherwise it is not possible for the Master to build up a communication to this device.	1 … 127
Device Profile and Device Type	Because of the information of the **Device Profile** and the **Device Type** during start of communication, the Master can read out the Object 1000H from the Node and compare it with these data. Each CANopen Node has a mandatory Object 1000H, which must be present in the object directory. This object is named **Device Type**. The **Device Type** also includes the information about the **Device Profile**. The Master reads out the Object 1000H from the Node when starting up the CANopen bus and compares the entries, which are made in the two available fields **Device Profile** and **Device Type**. If the **Device Profile** and the **Device Type** do not match, the Master reports a parameterization error and does not establish a process data transfer to the Node. The verification can be also deactivated.	Value read out from the EDS file
Device Name, Hard and Software Version	Displayed manufacturer data read out from the EDS file.	Value read out from the EDS file

Table 9: General Settings > Node ID, Device, Vendor

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3.4 Special Function Objects

The **Special Function Objects** dialog displays parameter data of the

- **Synchronization Message,**
- **TimeStamp Message**
- and the **Emergency Message**.

The displayed data partly originate from the CANopen specification and can not be edited here. The **SYNC COB-ID** generally can be changed via the CANopen Master DTM. Select here whether:

- the CANopen Slave device shall generate the synchronization message,
- the CANopen Slave device shall consume/produce the time stamp message,
- the CANopen Master device shall be able to receive the emergency message
- and whether for each of these messages the 29-bit CAN-ID of the CAN-ID extended frame shall be valid.

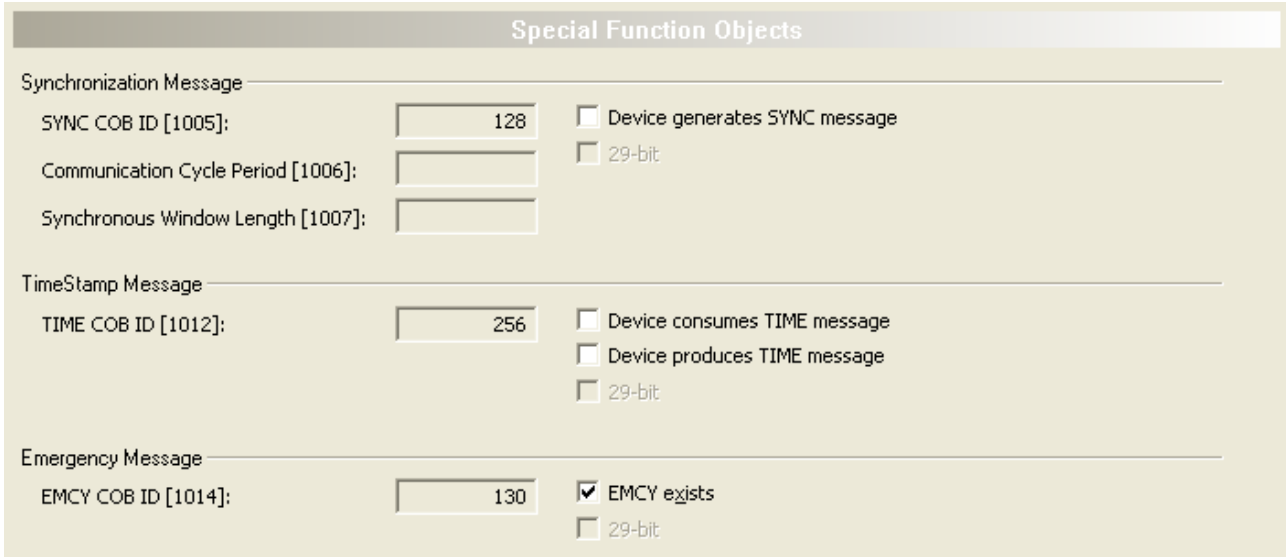

Figure 6: Special Function Objects

3.4.1 Synchronization Message

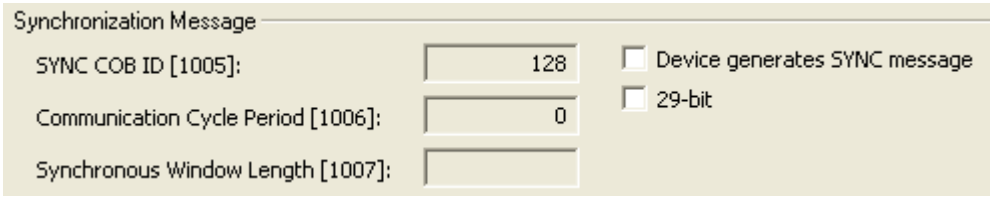

Figure 7: Special Function Objects - Synchronization Message

Parameter	Meaning		Range of Values / Value
Synchroni-zation Message	A PDO in CANopen can be configured in Event Driven mode or Cyclic Transmission. Both kinds of transmission types can be synchronized to a special **synchronization message** which is sent by the master in defined time intervals.		
SYNC COB-ID [1005]	The **SYNC COB-ID** is assigned by the master and cannot be edited here. It can be changed only by the CANopen Master DTM. The **SYNC COB-ID** specifies the Identifier of the synchronization message. If the **Communication Cycle Period** is not equal to zero, the transmission of the SYNC message is activated.		Default: 128
	Device generates SYNC message	If checked, the CANopen Slave device generates the synchronization message.	Default: Values from EDS file
	29-bit	If checked, for this PDO the 29-bit CAN-ID of the CAN-ID extended frame is valid. If not checked, for this PDO the 11-bit CAN-ID is valid.	
Communi-cation Cycle Period [1006]	The **Communication Cycle Period** is assigned by the Master and cannot be edited here. It can be changed only by the CANopen Master DTM. The **Communication Cycle Period** specifies the time for the interval for the transmission the SYNC message.		
Synchronous Window Length [1007]	The **Synchronous Window Length** is assigned by the master and cannot be edited here. It can be changed only by the CANopen Master DTM. The **Synchronous Window Length** specifies the length of the time window for synchronous PDO (process data objects).		

Table 10: Special Function Objects - Synchronization Message

3.4.2 Time Stamp Message

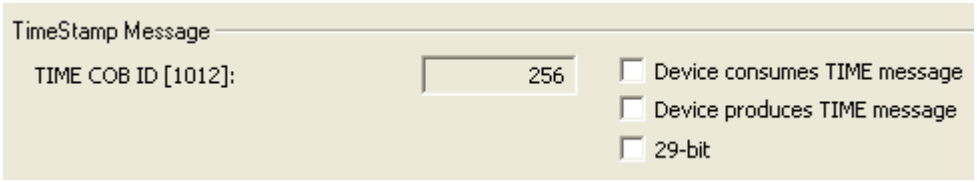

Figure 8: Special Function Objects - Time Stamp Message

Parameter	Meaning		Range of Values / Value
Time Stamp Message	For transmission of time data.		
TIME COB-ID [1012]	The **TIME COB-ID** is assigned by the Master and cannot be edited here. It can be changed only by the CANopen Master DTM. The **TIME COB-ID** specifies the COB-ID of the time stamp object.		Default: 256
	Device consumes TIME message	If checked, the CANopen Slave device consumes the time stamp message.	Default: Values from EDS file
	Device produces TIME message	If checked, the CANopen Slave device produces the time stamp message.	
	29-Bit	If checked, for this PDO the 29-bit CAN-ID of the CAN-ID extended frame is valid. If not checked, for this PDO the 11-bit CAN-ID is valid.	

Table 11: Special Function Objects - Time Stamp Message

3.4.3 Emergency Message

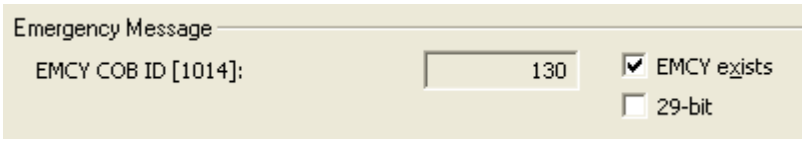

Figure 9: Special Function Objects - Emergency Message

Parameter	Meaning		Range of Values / Value
Emergency-Message	Emergency messages are sent by the Node when a node internal event occurs. The CANopen Master can buffer maximally 5 Emergency messages.		
EMCY COB-ID [1014]	The **EMCY COB-ID** is assigned by the Master and cannot be edited here. It can be changed only by the CANopen Master DTM. The **EMCY COB-ID** specifies the COB-ID of the Emergency message.		129 … 255, Default (depends from Node ID): 129 (for Node ID =1), 130 (for Node ID =2), …
	EMCY exists	If checked, the CANopen Master can receive EMCY (Emergency) messages.	Default: Values from EDS file
	29-Bit	If checked, for this PDO the 29-bit CAN-ID of the CAN-ID extended frame is valid. If not checked, for this PDO the 11-bit CAN-ID is valid.	

Table 12: Special Function Objects - Emergency Message

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3.5 Object Dictionary

The dialog **Object Dictionary** represents the object dictionary of the device. The display shows data read out from the EDS file.

By means of filters in the table **Object Configuration** lists with configured and/or not configured objects can be displayed. A search function allows searching for a special object within the lists.

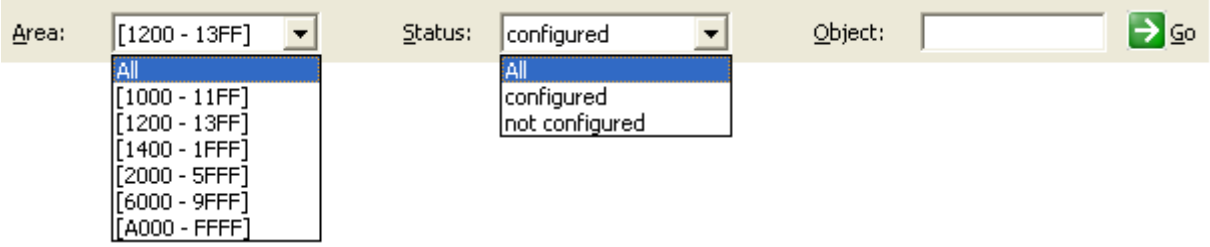

Figure 10: Object Dictionary - Filter Object Configuration

Parameter	Meaning	Range of Values / Value
Area	Via **Area** a filtered object dictionary area can be selected, which is displayed in the table **Object Configuration**. If **All** is selected, in the table **Object Configuration** all objects are displayed, which are defined in the EDS file.	All, 0x1000 … 0x11FF, 0x1200 … 0x 13FF, 0x1400 … 0x1FFF, 0x2000 … 0x5FFF, 0x6000 … 0x9FFF, 0xA000 … 0xFFFF, Default: All
Status	Via **Status** it is possible to specify whether in the table **Object Configuration** all objects, only the configured objects or only the not configured objects of the selected range are to be displayed. Only the objects configured are relevant for data exchange.	All, configured, not configured, Default: All
Object	In the searching field **Object** the object index and/or the object index and subindex of a certain object can be entered. If the arrow button **-> Go** is clicked, the searched object (if available) is displayed in the upper line of the table **Object Configuration**. To enter an object index with subindex a dot is used. Example: 1400.01	Min: 0000 Max: FFFF

Table 13: Object Dictionary - Filter Object Configuration

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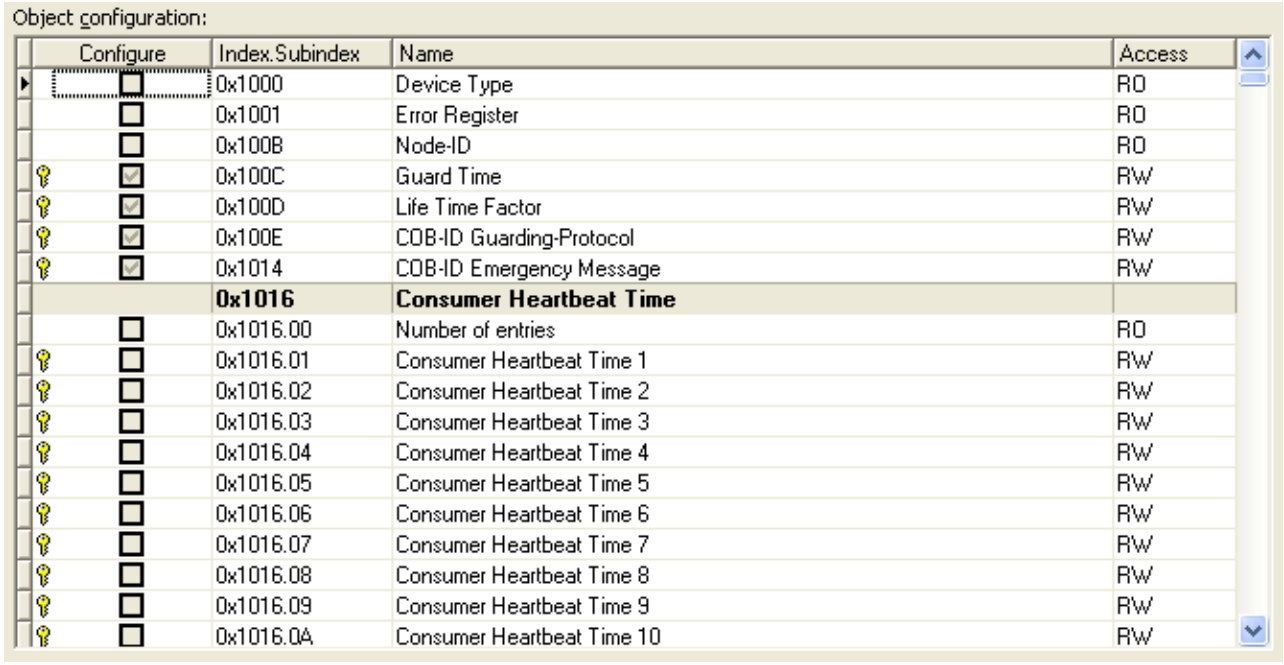
The objects read out from the EDS file are displayed in the table **Object Configuration**. For better readability for objects with subindex a heading (object index without subindex) is displayed.


Object configuration:

Configure	Index.Subindex	Name	Access
☐	0x1000	Device Type	RO
☐	0x1001	Error Register	RO
☐	0x100B	Node-ID	RO
☑	0x100C	Guard Time	RW
☑	0x100D	Life Time Factor	RW
☑	0x100E	COB-ID Guarding-Protocol	RW
☑	0x1014	COB-ID Emergency Message	RW
	0x1016	**Consumer Heartbeat Time**	
☐	0x1016.00	Number of entries	RO
☐	0x1016.01	Consumer Heartbeat Time 1	RW
☐	0x1016.02	Consumer Heartbeat Time 2	RW
☐	0x1016.03	Consumer Heartbeat Time 3	RW
☐	0x1016.04	Consumer Heartbeat Time 4	RW
☐	0x1016.05	Consumer Heartbeat Time 5	RW
☐	0x1016.06	Consumer Heartbeat Time 6	RW
☐	0x1016.07	Consumer Heartbeat Time 7	RW
☐	0x1016.08	Consumer Heartbeat Time 8	RW
☐	0x1016.09	Consumer Heartbeat Time 9	RW
☐	0x1016.0A	Consumer Heartbeat Time 10	RW

Figure 11: Object Dictionary - Object Configuration

The table **Object Configuration** the following parameter data are provided.

Parameter	Meaning		Range of Values / Value
Configure	The Objects activated in the configuration are checked. The Objects which are not configured are unchecked.		configured (checked), not configured (unchecked)
	Symbol / Checkbox	Description	
	🔑	The objects marked with a key symbol can not be enabled or disabled for the configuration in the **Object Directory** dialog, but they can be added or removed from the configuration elsewhere in the user interface.	
	🔑 ☑	Objects activated in the configuration	configured (checkbox locked)
	🔑 ☐	Objects which are not activated in the configuration	not configured (checkbox locked)
	☑	Objects activated in the configuration	configured
	☐	Objects which are not activated in the configuration	not configured
Index.Sub-index	All objects are addressed in the object index and the corresponding subindex, which are defined by the EDS file.		Object index 0x1000 … 0xFFFF; Sub index 0x00 … 0xFF
Name	Symbolic name of the object, which is defined by the EDS file.		From EDS file
Access	Gives the access right of the object, which is defined by the EDS file.		RO = read only (read) RW = read, write (read, write) WO = write only (write) CONST = constant

Table 14: Object Dictionary - Object Configuration

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If in the table **Object Configuration** a line is clicked by the cursor, the selected object, the current value, the default value, the data type, the minimum and maximum value are displayed in the fields below the table. By **Display mode** data display can be chosen in decimal or in hexadecimal mode.

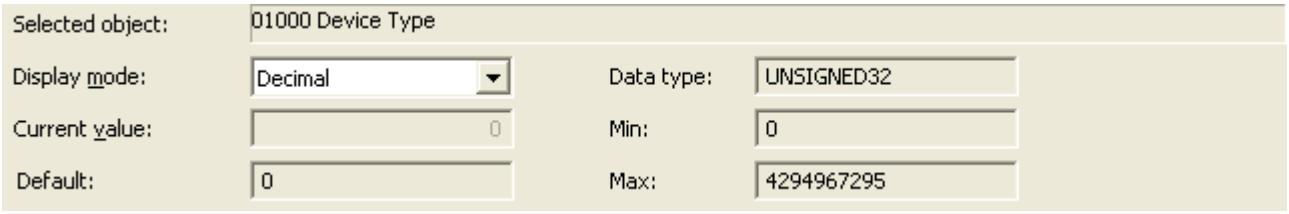

Figure 12: Object Dictionary - Data selected Object

Parameter	Meaning	Range of Value
Selected Object	In the display field **Selected Object** the object index, the subindex and the name of the selected object are indicated. These data are defined by the EDS file.	
Display Mode	By selection of the **Display Mode** decimal and/or hexadecimal from the list field the values are displayed in decimal and/or hexadecimal mode.	Hexadecimal, Decimal, Default: Hexadecimal
Current Value	In the input field **Current Value** a value can be assigned to the selected object.	
Default, Data Type, Min/Max	In the display fields **Default, Data Type** and/or **Min/Max** the default value defined in the EDS file, the data type and/or the minimum and maximum value for the object is indicated. The values **Min.** and **Max.** are displayed in decimal mode by default.	

Table 15: Object Dictionary - Data selected Object

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3.6 Process Data Objects

3.6.1 PDO Properties

In the dialog **PDO Properties** the transmit and the receive PDOs are displayed. Via **PDO Type** the display can be changed from transmit PDOs (TPDO) to receive PDOs (RPDO) and vice versa.

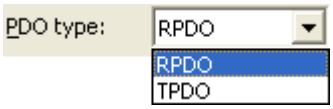

Figure 13: Process Data Objects > PDO Properties - PDO Type

The PDOs supported by the node are read out of the EDS file and displayed in the table **PDO Configuration**. The PDOs to be used for the communication can be specified i.e. configured in this window.

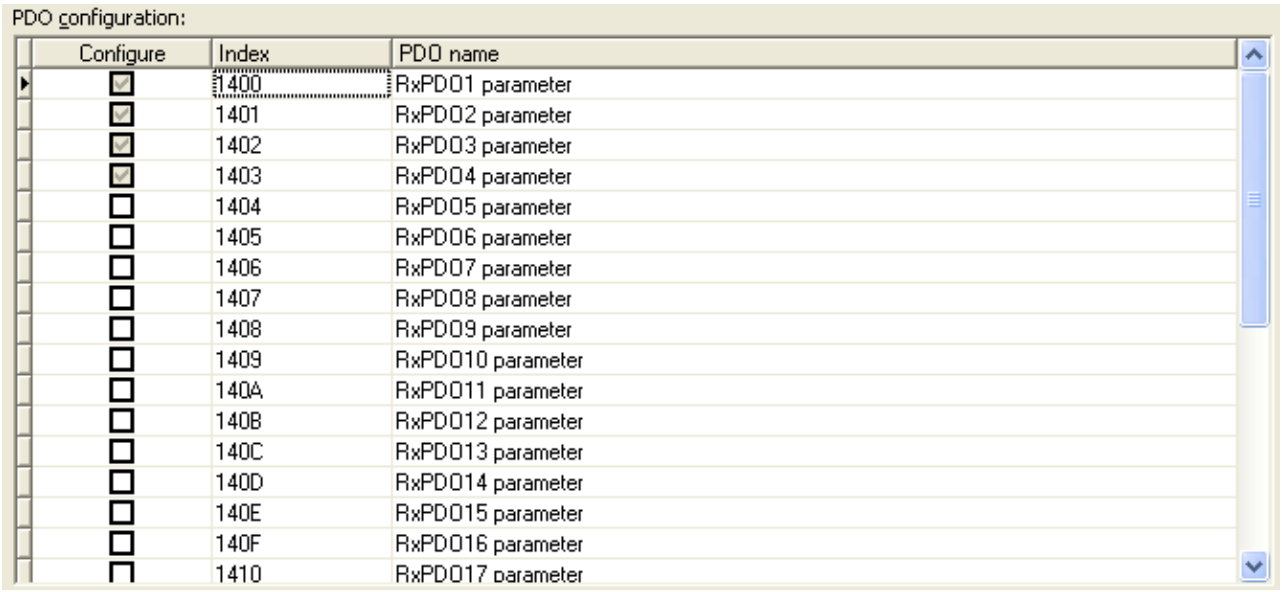

Figure 14: Process Data Objects > PDO Properties - PDO Configuration

Parameter	Meaning	Range of Values / Value
PDO Type	Filter function for the table **PDO Configuration** as - Transmit PDOs - **TPDO** = Transmit PDO or as - Receive PDOs - **RPDO** = Receive PDO. Transmit PDOs are sent by the node and are input data of the Master. Receive PDOs are output data of the Master and are received from the node.	TPDO RPDO
Configure	By activating/configuring of a PDO the PDO is used for the communication. The corresponding parameter values are part of the master configuration. During initialization the master transfers these parameters automatically into the node (default behavior). ***Note:*** *The transmission of the parameters during the initialization phase can also be deactivated and/or become deactivated. I.e., the node uses parameters, which can be different from the parameters set here.*	configured (checked), not configured (unchecked)

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Parameter	Meaning		Range of Values / Value
	Checkbox	Description	
	☒	PDOs activated in the configuration The PDO is used for the communication.	configured (checked) (checkbox locked)
	☑	PDOs activated in the configuration The PDO is used for the communication.	configured (checked)
	☐	PDOs which are not activated in the configuration The PDO is not used for the communication.	not configured (unchecked)
Index	Object Index of the Process data object (PDO)		0x1400 … 0x15FF 0x1800 … 0x19FF
PDO Name	Here RxPDO name and/or TxPDO name is indicated. These are defined in the EDS file.		

Table 16: Process Data Objects > PDO Properties - PDO Configuration (examine)

Each process data object (PDO) has characteristics. These are displayed below the table.

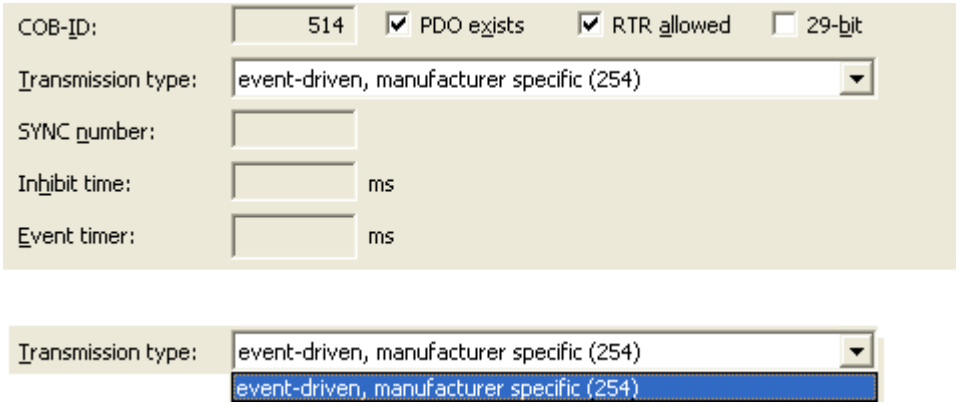

Figure 15: Process Data Objects > PDO Properties - Data selected Object (Example)

Parameter	Meaning		Range of Values / Value
COB-ID	The COB-ID contains the CAN identifier and additional parameters for the related communication object. According to the CANopen specification ([2] page 131, Table 73) these are the „exists/not exists bit“, the „remote frame support bit“ (RTR allowed) and the „frame format 11 /29 bit“. COB-ID = Communication Object Identifier. The CAN identifier is the main part of the arbitration field of a CAN data frame or CAN remote frame. It comprises 11 bit (base frame format) or 29 bit (extended frame format). The CAN identifier value determines implicitly the priority for the bus arbitration.		0 … 2047
	PDO exists	If checked, the PDO is selected for the configuration.	Default: Values from EDS file
	RTR allowed	If checked, for this PDO the message-triggering mode “Remotely requested” is allowed, which means that the transmission of an event-driven PDO is initiated on receipt of a RTR initiated by a PDO consumer. If not checked, for this PDO the message-triggering mode “Remotely requested” is not allowed. Note: A RTR is not allowed to inquire for an emergency transmission. [2] RTR = Remote transmission request	

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Parameter	Meaning		Range of Values / Value
	29-bit	If checked, for this PDO the 29-bit CAN-ID of the CAN-ID extended frame is valid. If not checked, for this PDO the 11-bit CAN-ID is valid.	
Transmission Type	For the transmit and/or receive PDOs different transmission types are possible. For a PDO in CANopen event driven, synchronous or asynchronous transmission can be configured. Transmission types can be synchronized to the synchronization message SYNC for example, which is sent by the master in defined time intervals. Synchronous means that the transmission of the PDO is related to the SYNC message. Asynchronous means that the transmission of the PDO is not related to the SYNC message and can be done at any time. ***Note:*** *The support of the different transmission types is manufacturer and device dependent. For CANopen the support of individual and/or all transmission types is not required. Whether a device supports the desired transmission type, must be reread and/or examined in the technical manual of the used device, if necessary.*		0 … 255 synchronous acyclic (0) synchronous cyclic (1-240) synchronous RTR (252) asynchronous RTR (253) Event driven, profile specific (254) Event driven, manufacturer specific (255)
SYNC number	For synchronous TPDOs for the transmission type **synchronous cyclic (1-240)** another number is to be set, to which SYNC message the data transmission refers. A SYNC number of 1 means that the message will be transferred with each SYNC message. A SYNC number of n means that the message will be transferred with each n-th SYNC message. Asynchronous TPDOs are not transferred in a temporal correlation with a SYNC.		
Inhibit Time	The **Inhibit Timer** (if supported) describes the time interval, which at least must be waited between the transmissions of two equal messages. Thus a too frequent transmission of the same message is suppressed.		
Event Timer	The **Event Timer** (if supported) is possible only for TPDO transmission types 254 and 255. The expiration of the timer is used in the node as event, in order to send the TPDO. Manufacturer and/or device-specifically also an application event can activate the sending of the TPDOs and reset the **Event Timer**.		TPDO 254, 255

Table 17: Process Data Objects > PDO Properties - Data selected Object

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3.6.2 PDO Mapping

The dialog **PDO Mapping** permits to map the contents of a PDO.

By use of the **Filter PDO type** field in the table **Mappable Objects** the receive PDOs (RPDO) or alternatively the transmit PDOs (TPDO) can be displayed.

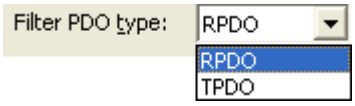

Figure 16: Process Data Objects > PDO Mapping - Filter PDO Type

In the list field **Object Dictionary Area** an object dictionary area can be preselected.

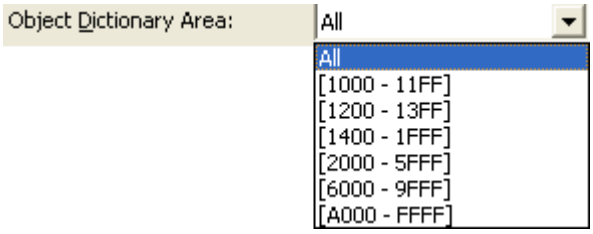

Figure 17: Process Data Objects > PDO Mapping - Object Dictionary Area

The mappable objects appropriate to the preselection are listed in the table **Mappable Objects**.

Mappable objects:

Index.Subindex	Parameter	Data type	Length	Access
02200	**Digital Byte Outputs**			
02200.01	Output Byte 1	UNSIGNED8	8	WO
02200.02	Output Byte 2	UNSIGNED8	8	WO
02200.03	Output Byte 3	UNSIGNED8	8	WO
02200.04	Output Byte 4	UNSIGNED8	8	WO
02200.05	Output Byte 5	UNSIGNED8	8	WO
02200.06	Output Byte 6	UNSIGNED8	8	WO
02200.07	Output Byte 7	UNSIGNED8	8	WO
02200.08	Output Byte 8	UNSIGNED8	8	WO
02200.09	Output Byte 9	UNSIGNED8	8	WO

Figure 18: Process Data Objects > PDO Mapping - Mappable Objects

Parameter	Meaning	Range of Value
Object Dictionary Area	Object dictionary filter range.	All, 0x1000 … 0x11FF, 0x1200 … 0x 13FF, 0x1400 … 0x1FFF, 0x2000 … 0x5FFF, 0x6000 … 0x9FFF, 0xA000 … 0xFFFF, Default: All
Mappable Objects	List of the mappable objects.	from EDS file
Index. Subindex	All objects are addressed in the object index and if necessary in the corresponding subindexes, which are defined by the EDS file.	0x1000 … 0xFFFF as well as 0 … 0xFF
Parameter	Name of the object from the EDS file.	from EDS file
Data type	Data type of the object from the EDS file respectively according to the data types (Object dictionary data types) listed in the CANopen specification ([2] page 90, Table 44).	from EDS file
Length	The length of the PDOs in bytes.	

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Parameter	Meaning	Range of Value
Access	Gives the access rights of the process data objects, which are defined by the EDS file.	rw = read, write

Table 18: Process Data Objects > PDO Mapping - Mappable Objects

In the list field **PDO Contents Mapping for** the PDO is selected, the PDO contents to be displayed.

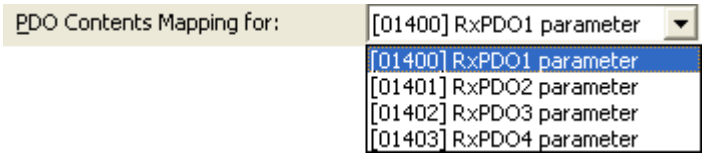

Figure 19: Process Data Objects > PDO Mapping - Filter Mapped Objects

The mapped objects appropriate to the preselection are listed in the table **Mapped Objects**.

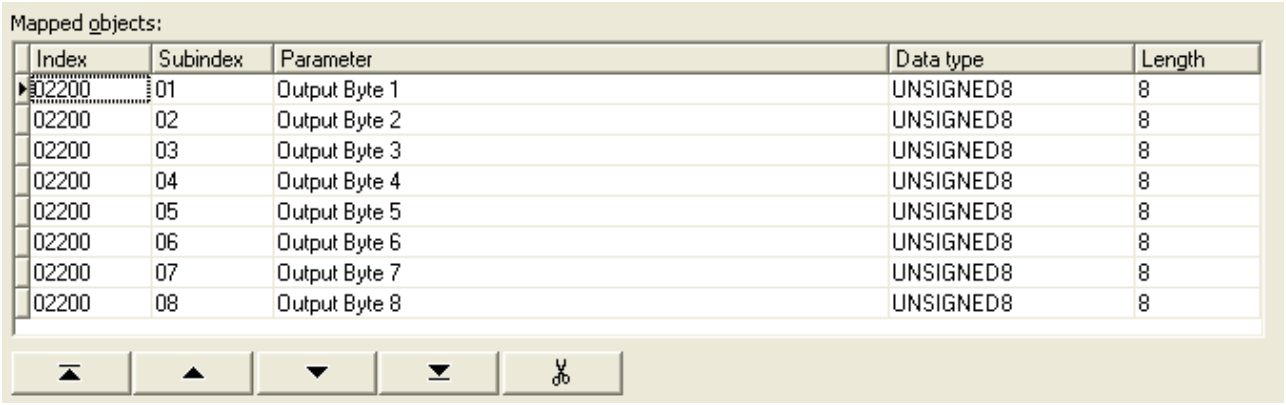
Mapped objects:
Index Subindex Parameter Data type Length
02200 01 Output Byte 1 UNSIGNED8 8
02200 02 Output Byte 2 UNSIGNED8 8
02200 03 Output Byte 3 UNSIGNED8 8
02200 04 Output Byte 4 UNSIGNED8 8
02200 05 Output Byte 5 UNSIGNED8 8
02200 06 Output Byte 6 UNSIGNED8 8
02200 07 Output Byte 7 UNSIGNED8 8
02200 08 Output Byte 8 UNSIGNED8 8

Figure 20: Process Data Objects > PDO Mapping - Mapped Objects

Parameter	Meaning	Range of Value
PDO Contents Mapping for	The PDO list field **PDO Contents Mapping for** contains all configured PDOs of the pane PDO Properties. The objects responsible for data exchange (max. 8 byte/PDO) are assigned to the PDOs.	
Filter PDO Type	The mapping is proceeded separately for the RPDOs and/or the TPDOs.	RPDO TPDO
Mapped Objects	The table **Mapped Objects** contains only configured objects and always corresponds in the PDO list field **PDO Contents Mapping for** selected PDOs.	
Index. Subindex	All objects are addressed in the object index and if necessary in the corresponding subindexes, which are defined by the EDS file.	0x1000 … 0xFFFF as well as 0 … 0xFF
Parameter	Name of the parameter from the EDS file.	from EDS file
Data type	Data type of the object from the EDS file respectively according to the data types (Object dictionary data types) listed in the CANopen specification ([2] page 90, Table 44).	from EDS file
Length	The Length specifies the length of the PDOs.	

Table 19: Process Data Objects > PDO Mapping - Mapped Objects

To change the object sequence in the table **Mapped Objects** more easily, shifting buttons are available: move completely above, above, down and completely down.

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4 Device Description

4.1 Overview Device Description

Descriptions of "Device Description"

The table below gives an overview for the **Device Description** dialog panes descriptions:

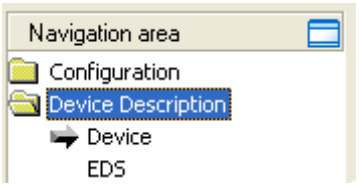
CANopen generic Slave DTM	Folder Name / Section	Page
 *Navigation Area - Description*	*Device*	*28*
	EDS	31

Table 20: Descriptions of the Dialog Panes Device Description

4.2 Device

The **Device Info** dialog contains manufacturer information about the device, which is defined in the EDS file. The following information is indicated:

Parameter	Meaning
Vendor Name	Name of the device manufacturer
Vendor ID	Identification number of the manufacturer
Product name	Name of the device as specified by the manufacturer
Product number	Number of the Device as specified by the manufacturer
Revision number	Hardware reference of the device as specified by the manufacturer
Order Code	Order Code of the device as specified by the manufacturer

Table 21: Device Description > Device

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4.3 EDS

The **EDS Viewer** pane shows the content of the EDS file in a text view.

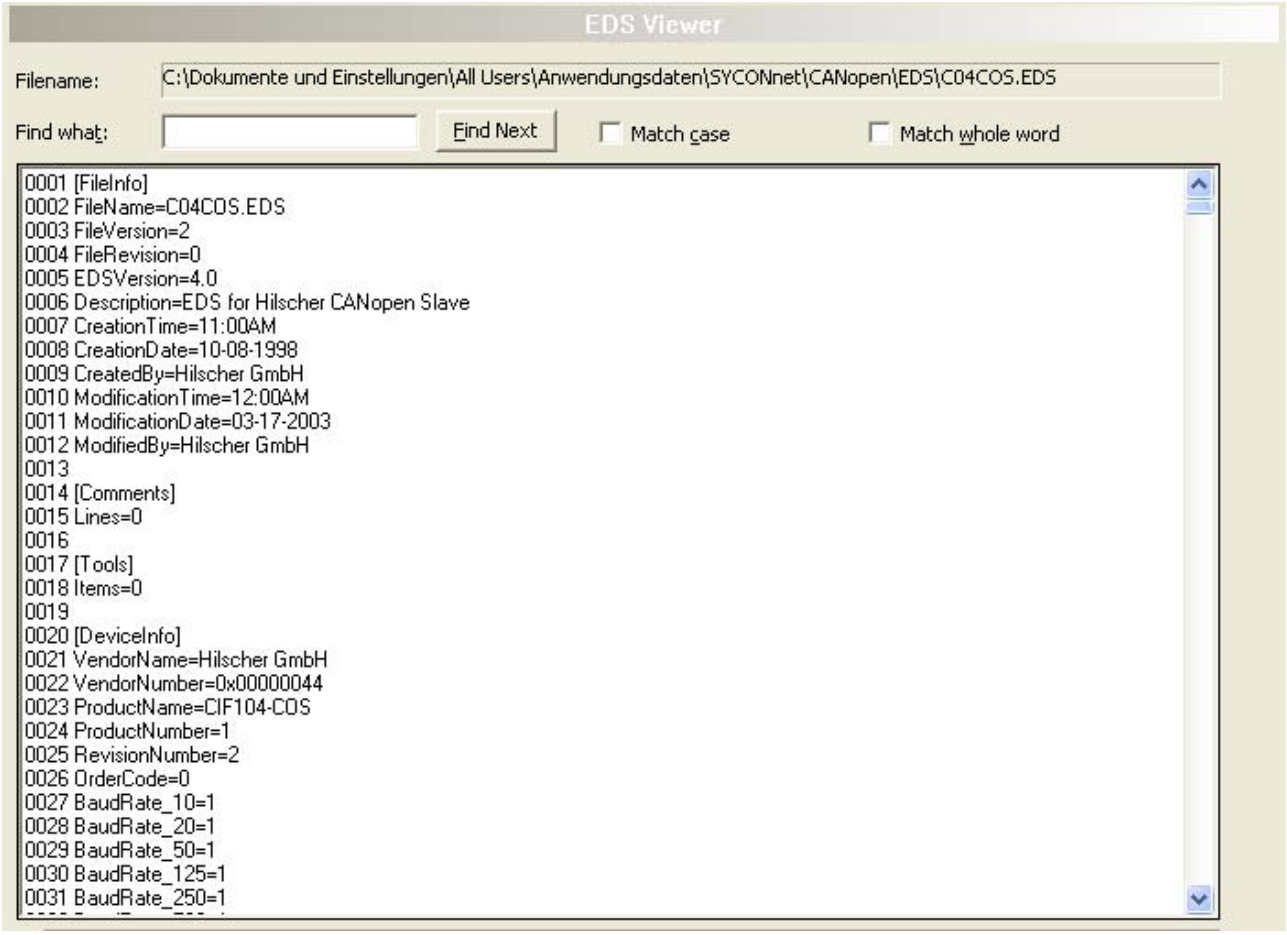

Figure 21: EDS Viewer

Under **Filename** the file directory path and the file name of the displayed EDS file is displayed. **Find what** offers a search feature to search for text contents within the text of the EDS file.

In the **EDS Viewer** pane on the left side, the line number is displayed for simple overview, the further entries show the EDS file in text format.

Parameter	Meaning
Filename	File directory path and the file name of the displayed EDS file.
Find what	Search feature to search for text contents within the text of the EDS file.
Match case	Search option
Match whole word	Search option

Table 22: Device Description - EDS Viewer

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5 Appendix

5.1 COB-ID (Predefined Connection Set)

COB-ID stands for communication object identifier. This is the 11 bit covering message identifier of a CAN message. Thereby the upper 4 bits (bit 11 to 8) are the function identifier and the lower 7 bits (bit 7 to bits 0) the bus address of the node.

Broadcast Objects:

Object	Function Code	COB-ID hex	COB-ID dec	Index in the Object Dictionary
NMT	0000	00H	0	-
SYNC	0001	80H	128	1005H, 1006H, 1007H
TIME STAMP	0010	100H	256	1012H, 1013H

Table 23: COB-ID - Broadcast Objects

Peer-to-Peer Objects:

Objects	Function Code	COB-ID hex	COB-ID dec	Index in the Object Dictionary
Emergency	0001	81H-FFH	129-255	1014H, 1015H
PDO 1 (tx)	0011	181H-1FFH	385-511	1800H (1A00H)
PDO 1 (rx)	0100	201H-27FH	513-639	1400H (1600H)
PDO 2 (tx)	0101	281H-2FFH	641-767	1801H (1A01H)
PDO 2 (rx)	0110	301H-37FH	769-895	1401H (1601H)
PDO 3 (tx)	0111	381H-3FFH	897-1023	1802H (1A02H)
PDO 3 (rx)	1000	401H-47FH	1025-1151	1402H (1602H)
PDO 4 (tx)	1001	481H-4FFH	1153-1279	1803H (1A03H)
PDO 4 (rx)	1010	501H-57FH	1281-1407	1403H (1603H)
SDO (tx)	1011	581H-5FFH	1409-1535	1200H
SDO (rx)	1100	601H-67FH	1537-1663	1200H
NMT Error Control	1110	701H-77FH	1793-1919	1016H, 1017H

Table 24: COB-ID - Peer-to-Peer Objects

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5.2 User Rights

User-rights are set within the FDT-container. Depending on the level the configuration is accessible by the user or read-only.

To access the **Configuration** and **Device Description** panes of the Generic CANopen Slave DTM you do not need special user rights.

Note: To edit, set or configure the parameters of the **Configuration** panes, you need user rights for *Maintenance,* for *Planning Engineer* or for *Administrator*.

The **Device Description** panes do not contain any editable elements. The indicated values in are only for information purposes.

The following tables give an overview of the user right groups and which user rights you need to configure the single parameters.

5.2.1 Configuration

	Observer	Operator	Maintenance	Planning Engineer	Administrator
General Settings	D	D	X	X	X
Special Function Objects	D (X)	D (X)	X	X	X
Object Dictionary	D (X)	D (X)	X	X	X
Process Data Objects	D (X)	D (X)	X	X	X
PDO Properties	D (X)	D (X)	X	X	X
PDO Mapping	D	D	X	X	X

Table 25: Configuration (D = Displaying, X = Editing, Configuring)

5.3 References

[1] Device Type Manager (DTM) Style Guide, Version 1.0 ; FDT-JIG - Order No. <0001-0008-000>

[2] CAN in Automation e.V., Erlangen: CANopen Application Layer and Communication Profile, CiA Draft Standard 301, Version 4.2.0, February 2011

[3] CANopen Master Protocol API Manual, Revision 14, Hilscher GmbH 2013

[4] CANopen Slave Protocol API Manual (V3), Revision 4, Hilscher GmbH 2013

[5] CANdictionary, 6th edition, June 2011, CAN in Automation international users' and manufacturer's group e. V.

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5.6 Glossary

CAN-ID

The CAN identifier is the main part of the arbitration field of a CAN data frame or CAN remote frame. It comprises 11 bit (base frame format) or 29 bit (extended frame format). The CAN identifier value determines implicitly the priority for the bus arbitration.

COB-ID

Communication Object Identifier.

The COB-ID contains the CAN identifier and additional parameters for the related communication object. According to the CANopen specification ([2] page 131, Table 73) these are the „exists/not exists bit“, the „remote frame support bit“ (RTR allowed) and the „frame format 11 /29 bit“.

DTM

Device Type Manager

The Device Type Manager (DTM) is a software module with graphical user interface for the configuration and/or for diagnosis of devices.

EDS

An Electronic Data Sheet (EDS) provides information necessary to access and alter the configurable parameters of a device. An Electronic Data Sheet (EDS) is an external file that contains information about configurable attributes for the device, including object addresses of each parameter. The application objects in a device represent the destination addresses for configuration data. These addresses are encoded in the EDS.

FDT

Field Device Tool

FDT specifies an interface, in order to be able to use DTM (Device Type Manager) in different applications of different manufacturers.

Master

Master devices initiate the data exchange at the bus.

RTR

Remote transmission request

Node ID

The Node ID is the network address of the device. The network address serves to distinguish itself from other devices on the network. Therefore an unique address must be assigned to each device.

Slave

Slave devices are configured by the Master and perform then the communication.

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